

## GUEST EDITORIAL PREFACE

# SMEs and Competitiveness: The Role of Information Systems

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## ABSTRACT

*In this introductory article for the special issue on “SMEs and Competitiveness—The Role of Information Systems,” we provide a review of the current state of research on information systems and SMEs. A framework is provided that illustrates where the research has been concentrated and which areas are just beginning to be explored. The six articles that constitute this special issue are described in terms of this framework. A brief review of the articles is provided in which we indicate the question addressed, the factors taken into account, the nature of the research, and the dominant theory and perspective used in the article. We conclude by suggesting some future research directions.*

*Keywords: Competition; Diffusion; E-business; Environmental Characteristics; Innovation; Organizational Characteristics; Small And Medium Sized Enterprises (SMEs); Strategy*

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## INTRODUCTION

Our goal in developing a special issue on small and medium enterprises (SMEs) and the role of information systems (IS) in their competitiveness has been to encourage research into SMEs and highlight the use of new theories and frameworks. Our call for articles generated 21 submitted articles, and six are being published in this special issue. These six articles do an excellent job of realizing our objective, as they cover multiple approaches and themes.

In this article, we show how research into SMEs and IS is progressing away from the limited focus on IS adoption. We also focus on how SMEs differ from large firms in terms of both their organizational characteristics and how they relate to their environment. Finally, we provide a

short commentary on the six articles and identify promising new directions in future research.

Notwithstanding the importance of SMEs in the economy, the space provided for research on the IT aspects of SMEs in most standard journals has been limited. This is evidenced by the fact that only a single article on the subject has been published (Street and Meister, 2004) in the last six years in the top three IS journals in the US: MISQ, ISR, and JMIS. Small and medium-sized enterprises (SMEs) play a very important role in the US economy.

SMEs should be an important subject of study for IS academic researchers for several reasons. First, the employment scope of SMEs is significant in the US and EU countries (Brown and Lockett, 2004). SMEs employ half of all private-sector employees, pay more than 45% of total US private payroll, and have generated 60-80% of net new

jobs annually over the last decade. SMEs also employ 40% of high-technology workers such as scientists, engineers, and computer workers. Second, the innovation potential of SMEs in many areas is the primary growth driver of the industry (Morgan, 1997). SMEs are generally low-tech firms, but cutting-edge firms in biotechnology and in the computer sector are often small or medium enterprises. SMEs produce 13 to 14 times more patents per employee than large patenting firms, and these patents are twice as likely as large firms' patents to be among the 1% most cited.<sup>1</sup> Finally, the SME sector drives the renewal process of the economy through birth, death, and restructuring.

## CURRENT AND EMERGING RESEARCH

The SME and IS research framework (Figure 1) identifies the important antecedent factors such as organizational characteristics and environmental factors used in IS research for SMEs. The goals have usually been adoption and nature of the IS asset. Increasingly, we also have firm-level performance appearing as one of the goals to be causally explained.

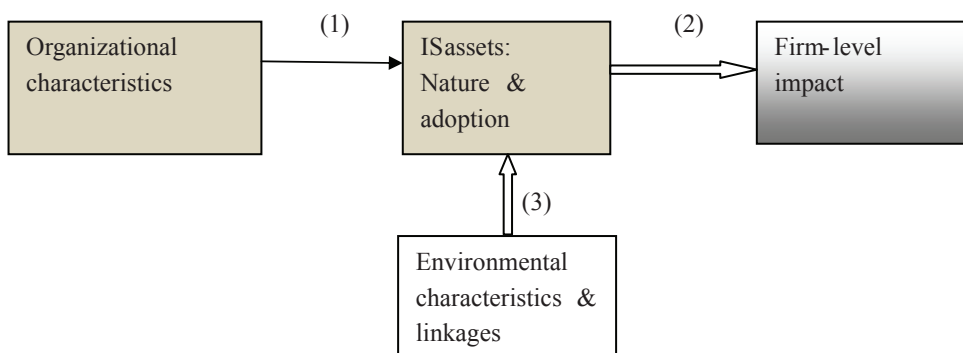
IS research on SMEs has mainly been focused on implementation issues (Thong, Yap, and Raman, 1994; Thong, Yap, and Raman, 1996), maturity issues (Prananto et al., 2003), motivators and inhibitors (Craig and King, 1993), acceptance and impact (Iacovou, Benbasat, and Dexter, 1995;

Igbaria, Zinatelli, Cragg, and Cavaye, 1997), and factors relating to satisfaction and success (DeLone, 1988). Thong (1999) provided an integrated model of IS adoption in small businesses where factors relevant to the firm, such as CEO characteristics and organizational characteristics, and a single environmental factor of competition were used.

The relationship between organizational characteristics and IS asset adoption and utilization is shown as link 1 in Figure 1.

With the advent of e-commerce, the role of e-commerce in the world of SMEs became a burgeoning new research area. More than half the articles in the book *Managing Information Technology in Small Business*, edited by Burgess (2002), were on this subject. The research focus widened to include more antecedent factors and how IS assets related to the internet were affecting firm performance (link 2 in Figure 1). Levy et al. (2002) found that most SMEs were moving from a limited focus on efficiency to a wider set of goals that included collaboration and innovation. Lefebvre and Lefebvre (1993) demonstrated linkages between IT, innovation, and competitive success on the part of SMEs. Quale (2002), Quale and Christiansen (2004), Levy and Powell (2003), and Beckinsale et al. (2006) identified drivers for Internet adoption by SMEs as reduced operating costs, improved service to customers, improved market intelligence, and enhanced relationship with trading partners. Similarly, Tse and Soufani (2003) found the drivers affecting SMEs' technology decisions to be improved services to custom-

Figure 1. The SME and IS research framework



ers, increased response speed, and administrative cost reduction. Mehrtans et al. (2001) found that factors such as improved trading relationships and improved market intelligence among SMEs were motivators for investing in Web-based technologies. In general, Levy et al. (2005) found that strategic intent directed toward new products and markets on the part of SMEs drove adoption of various e-business technologies.

The relationship between environmental factors and IS assets has recently become a focus for research (link 3 in Figure 1) (Bharati and Chaudhury, 2008). The use of institutional theory is becoming common in this stream (Liang et al., 2008). This special issue highlights new research that links environmental characteristics to IS assets and IS assets to firm-level performance (links 2 and 3 in Figure 1).

## SMES VERSUS LARGE FIRMS

It is well known that SMEs are different from large firms where information systems are concerned, and organizational theories applicable to large firms may not be applicable to them (Bharati and Chaudhury, 2006; Dandridge, 1979; Senn and Gibson, 1981; Blili and Raymond, 1993). A small firm is “not a little big business,” according to Welsh and White (1981), and there is a need to take off the big organization glasses when studying technology issues in small firms (Thong, 1999). How are small businesses in general different from large firms? We identify some of these differences below and outline where they play a role in the six articles of this issue.

**Dis-economies of scale and limited autonomy:** The first obvious characteristic of SMEs is their size, which has particular consequences. They suffer acutely from dis-economies of scale (Burgess, 2002). SMEs are much more constrained in their growth and business activities as a consequence of low resources (Beck, Demircuc-Kunt, and Maksimovic, 2005). SMEs are prone to low capitalization and cash flow problems (Davison and Dutia, 1991). They have limited marketing and buying powers and enjoy limited autonomy in their decisions. They buy and sell in small quantities, which leads to large unit costs. They are exclusively price takers in the market for what they sell and what they buy (Curran and Black-

burn, 2001). SMEs’ small resource base and lack of economic clout mean they cannot influence market prices and terms of trade, so they have to tailor their strategy in line with their resources (Edelman, Brush, and Manolova, 2005).

**Low risk propensity:** SMEs have small asset bases. Often, a significant portion of the capital is sourced from the owners. SMEs are therefore more risk-averse (Leyden and Link, 2004) than large firms where decision are made by managers who have no direct stake in the financial success of the firm (Wiklund, Gerard, and Zahra, 2005). The capacity of SMEs to take economic risks and invest for the very long term is limited (Hunter et al., 2002). They act more as promoters than as manager-trustees. SMEs are almost always behind the curve in adopting new business and manufacturing technologies, compared to large firms (Afuah, 2003).

**Centralization and low formalism level:** The decision-making power within a small firm is held closely by the owners and top managers (Chell and Hawarth, 1991). It is therefore hard to access and influence decision-makers in the SME world. Multiple tasks and functions are done by the same people and departments in order to wring out as much economy of scale as possible. Managers perform daily administrative tasks as well as making business decisions, and these tasks cannot be easily peeled off to an outsourcer. Subdividing this further between in-house and outsourcers only aggravates the scale problem. Management practices within SMEs are often ad hoc and informal. They have limited formal planning and control procedures operating in the firm (Boohalis 1996; Chell, Hawarth, and Brearly, 1991). There is little knowledge of the actual costs of various administrative and productive tasks (Nayak and Greenfield, 1994). They do not have good information about their in-house costs, and therefore are not impressed by potential reductions in costs that they are not even aware of. Top decision-makers at SMEs focus on surviving and taking advantage of market opportunities as and when they arise.

**Cultural Insularity and identity-based trust relationships:** SMEs, as a result of their size, are often limited to interacting with firms in a limited geographical area. Their suppliers, customers, and employees tend to belong to a few different communities located in the same region (Burgess,

2002). SMEs are often organized in geographical clusters, which can be seen in the bio-sciences, software, textile, and metalworking industries (Khan and Ghani, 2004; Chiarvesio, Eleonora, and Stefano, 2004). Granovetter (1973) differentiated between strong and weak ties. Strong ties emphasize networks of family, community, and kinship, whereas weak ties refer to more dispersed relationships. An overreliance on strong ties on the part of SMEs (Mackinnon, Chapman, and Cumbers, 2004) leads to the problem of “lock-in” through progressive closure of networks, preventing access to other information and cultural sources (Grabher, 1993). SME managers’ exposure to diverse and particularly foreign cultures is limited in comparison to that of managers working for large multinational firms.

Business trust can be classified as either fragile trust or resilient trust (Ring, 1997). The former is based on arm’s-length transactions where transaction risks are managed through administrative control and the legal system. The latter is based on goodwill and social and personal relationships and understanding. Macneil (1980) described these two types as transactional and relational exchanges. SMEs, as a result of weak management systems, tend toward developing relational exchanges and depend on resilient trust in their inter-firm relationships. Trust plays an important role in the SME environment (Bennett and Robson, 2004). In SME clusters, their embeddedness in the society and the consequent social ties play an important role in their business dealings (Chiarvesio, Eleonora, and Stefano, 2004; Mackinnon, Chapman, and Cumbers, 2004). Monetary and pecuniary incentives play a proportionately weaker role in the SME environment (Agell, 2004).

## ARTICLES IN THIS ISSUE

Table 1 below provides an outline of the six articles in terms of our framework. These six articles among themselves cover the various factors and their relationships as identified in our framework.

Together they cover widely different approaches such as positivist, qualitative, and action-oriented research and organizational in-

novation, resource-based, and knowledge-based views of the firm.

In *The Internet as a Complementary Resource for SMEs*, Frank Schlemmer explores the complementary relationship between the independent variables of business resources, dynamic capabilities, and IT assets. The article is one of the rare studies on the subject of complementarity, an important concept in the resource-based view of the firm. He conducts a survey of 146 small firms in the Belfast and Northern Ireland area and limits himself to firms employing less than 250 people. The study found that the Internet is complementary with business resources and dynamic capabilities, but not with IT assets. The study highlights the threat of overinvestment in IT assets by small and medium enterprises.

In *Organizational Slack and Information Technology Innovation Adoption in SMEs*, Jaume Franquesa and Alan Brandyberry study the relevant dimensions of organizational slack in SMEs and investigate their impact on adoption of different types of IT innovations. They used data from a representative sample of 2,296 U.S. SMEs, and found that the slack-innovation relationships previously described in larger firms do not hold well for SMEs. Their results show *potential slack* (measured as access to external credit) to be a strong predictor of technology adoption in SMEs, whereas *available slack* appeared not to be a significant factor in SME innovation adoption. They found that in particular, e-commerce, which required lesser financial resources for SME adoption, was found to be pursued by those with lesser potential slack.

In *Business Process Digitalization and New Product Development: An Empirical Study of Small and Medium-Sized Manufacturers*, Jun Li, Michael Merenda, and A.R. (Venky) Venkatachalam explore the relationship between the extensiveness of business process digitalization (BPD) and new product development (NPD). The study is based on a sample of 85 small U.S. manufacturers that employ less than 500 employees and have a turnover between 1 million and 1 billion dollars. They suggest that (1) NPD is positively related to the extensive use of BPD and (2) the relationship between NPD and the extensiveness of BPD is stronger in more mature firms than in younger firms. The article concludes that SME production innovation strategies are positively associated

Table 1. An overview of articles based on the SME and IS research framework

Article Title	SME Characteristics	Environment and Linkages	IT Assets	Firm Performance	Research Type
The Internet as a Complementary Resource	Flexibility, dynamic capability	Supplier and customer relationship, availability of Internet	IT knowledge, operations, and objects	Financial performance	Positivist research based on the resource-based view of the firm
Organizational Slack and IT Innovation Adoption in SMEs	Firm age, education level, number of employees, degree of centralization		E-commerce and adoption of computer systems that directly affect the primary activity of the firm		Positivist research based on the organizational innovation perspective
Business Process Digitization and New Product Development	Firm age, product type, IT experience		Business process digitization	New product development	Positivist research based on the value chain perspective of the firm
Value of Information Systems to SMEs		SME customers and founders	Information and communication technologies (ICT)	Creation of positive image by use of ICT	Qualitative study based on organizational theory related to social norms and legitimacy
Training, Competence, and Business Performance		Availability of training facility	E-business competence	E-business performance	Use of qualitative and quantitative methods
IT Interventions for Growth of Competitiveness		Use of IT therapy to assist small enterprises in adopting appropriate IT solutions	Small business software such as QuickBooks and inventory management	Increase in competitiveness	Interpretive field study using action research

with the strategic use of BPD and span spatial, temporal, organizational, and industry boundaries, thus aiding SME global competitiveness.

In *The Value of Information Systems to Small and Medium-Sized Enterprises: Information and Communications Technologies as Signal and Symbol of Legitimacy and Competitiveness*, Susan J. Winter, Connie Marie Gaglio, and Hari K. Rajagopalan examine the role of information and communications technology (ICT) in legitimacy-building from the perspective of both SME founders and customers. They conducted in-depth, semi-structured interviews in a variety of industries in the San Francisco Bay Area and South Florida to determine whether the ICT-related legitimacy schema from the customers' perspec-

tive differs substantially from that of firm founders. The authors conclude that customers compare the ICT information provided in SMEs' sales pitches to pre-existing ICT expectations about the nature of desirable sales transactions.

In *Training, Competence, and Business Performance: Evidence from E-Business in European Small and Medium-Sized Enterprises*, Dag H. Olsen and Tom R. Eikebrokk study the relationship between training, competence, and the performance of SMEs in the context of e-business. The study is based on the performance of 339 SMEs in Norway, Finland, and Spain that had access to training supplies from 116 providers of e-business-related training. The empirical findings document a positive relationship between



training, competence, and performance and show that training explains variances in e-business competence and performance in terms of efficiency, complementarities, lock-in, and novelty.

In *Information Technology Interventions for Growth and Competitiveness in Micro-Enterprises*, Sajda Qureshi, Mehruz Kamal, and Peter Wolcott explore how micro-enterprises can adopt ICTs to grow and achieve competitiveness. They conducted an interpretive field study of a set of seven micro-enterprises in which they used action research to diagnose and treat the micro-enterprises with interventions through a process of "IT therapy." This process involved providing individualized IT solutions to pressing problems and opportunities and developing a customized longer-term IT project plan for each of the businesses. The increase in competitiveness of these micro-enterprises was assessed using the focus dominance model, and their growth was assessed through a modified model of micro-enterprise growth using the resource-based view of the firm.

## SOME FUTURE RESEARCH DIRECTIONS

Information systems research in the domain of SMEs has focused on inhibitors and promoters of technology adoption, especially where individual technologies are involved (link 1 in Figure 1). But there is scant evidence that the research has been extended to technologies that span the entire value chain (Bharati and Chaudhury, 2006). Fichman (2001) identified the importance of adoption research that aggregates technologies across types and stages of implementation. Extending this class of research to study the firm-level strategic impact of classes of technologies will uncover the relationship between classes of technologies and strategic payoffs (links 1 and 2 in Figure 1).

SMEs, due to their small asset bases, are much more vulnerable and open to the environment. Research in other fields related to SMEs has presented evidence of the relationship between environment and innovation (link 3 in Figure 1). For instance, manufacturing SMEs with more redundant sources of advice have been found to have greater access to competitive ideas (McEvily and Zaheer, 1999). In the case of the medical device

industry, Lofstrom (2000) advanced the hypothesis that firms report more learning when they are part of a broader network of non-redundant contacts. Along similar lines, McEvily and Zaheer (2000) showed that firms that deal with few customers suffer from low absorptive capacity.

Each SME firm is embedded within the institutional environment of a cluster (Morgan, 1997), and the cluster characteristics have an impact on the firm as well as the institutions. Clusters are critical masses of firms located in a geographically concentrated area that become a source of enduring competitive advantage (Porter, 2000). It is therefore appropriate to conduct research into the nature and characteristics of these clusters and the extent to which they promote and inhibit the firm-level assimilation of technologies. A question of interest: How are clusters structured, and to what extent do these structural differences explain the organizational-level outcomes (links 2 and 3 in Figure 1)?

Institutional theory has been used to examine firm-level adoption issues in recent studies that include both small and large firms (Liang et al., 2007; Teo et al., 2003). This lens has been limited to economic actors only, but in the case of small firms, sources of institutional influence must be expanded to include the social, cultural, and community environment in which SMEs are embedded. More research is required to study the SME environment in other parts of the US and the world. This has the potential to enrich and expand institutional theory.

It requires institutional effort to develop links among SMEs and within the community of vendors, suppliers, and government agencies. Some institutions need to act as "bridgers" that commit time, energy, and travel to develop social linkages over which information can flow, and that is the role of a community intermediary (Burt, 2005). Toyota's investment in infrastructure to facilitate communication and knowledge transfer among diverse supplier firms has had positive outcomes (Dyer and Nobeoka, 2000). The role of such community intermediaries in promoting the diffusion of complex technologies has also been observed by Swan and Newell (1995) and Newell et al. (2000). The role of such intermediaries is another promising avenue of future research.

In summary, new research into SMEs and IS needs to reflect the characteristic condition of

SMEs, in that they suffer from weak asset bases, low risk propensity, lack of formal planning and control mechanisms, and cultural insularity. In short, small firms are not scaled-down versions of large firms (Duxbury, Decade, and Tse, 2002).

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## ENDNOTE

- <sup>1</sup> <http://app1.sba.gov/faqs/faqindex.cfm?areaID=24>  
[last accessed on 1/7/2008]

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